Do spillover benefits grow with rising foreign direct investment? An empirical examination of the case of China

Wang, Chengqi; Yu, Li

Postprint / Postprint
Zeitschriftenartikel / journal article

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Journal:	*Applied Economics*
Manuscript ID:	APE-05-0310.R1
Journal Selection:	Applied Economics
Date Submitted by the Author:	21-Jul-2005
JEL Code:	F23 - Multinational Firms|International Business < F2 - International Factor Movements and International Business < F - International Economics
Keywords:	Foreign direct investment , Spillover effects, LOEs, Performance, China

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Using data for Chinese manufacturing industry for 2001, this paper examines the impacts of foreign presence on the performance of locally-owned Chinese firms. Our key result supports a curvilinear functional form. Foreign penetration rates in excess of just about two third of industrial capital are associated with declining spillover benefits, indicating the dominance of negative spillovers. The curvilinear relationship is found to be particularly strong in labour-intensive industries, contrasting a standard linear relationship in technology-intensive sectors. The finding of the complexity of spillover effects challenges the laissez-faire view that 'the more inward FDI, the better' and that inward FDI into all types of domestic industry is equally valuable, in terms of performance benefits. Our findings argue for policy measures to strengthen domestically-owned Chinese industry, to provide effective competition to foreign firms and to absorb the benefits from spillovers more effectively.

I. INTRODUCTION

The relationship between inward foreign direct investment (FDI) and the performance of host country locally-owned enterprises (LOEs) has been studied both intensively and extensively. Although the arguments for a positive relationship seem compelling, the results of empirical research are decidedly mixed. Prior studies reported either a positive, indeterminate, or negative relationship (Buckley *et al*. 2002, 2004; Liu *et al*. 2000). Görg and Strobl (2001) sought an explanation for the lack of congruent findings, believing that inconsistent results might be associated with underlying differences between the data sets employed. We argue in this paper that the disarray may be easily attributed to a misspecification of the nature of the relationship. Theoretical shortcomings have been a severe handicap to investigating the subject. As a result, methodological approaches employed to date have been flawed.

A drawback of the existing literature, with a few notable exceptions, is that it has largely been confined to examining linear forms of relationship. What the inconsistent results suggest, however, is that the relationship is far from a simple linear one. There is considerable evidence to suggest that the form of the relationship might be curvilinear (Aitken and Harrison, 1999). Thus, further evidence on the impact, and the form that this takes, of inward FDI on LOE's performance is still needed to advance theories and to promote the research stream's capability to effectively inform government policy formation.

The paper presents results from a study that attempts to remedy previous deficiencies in theory and methodology. We present an approach that addresses explicitly the possibility of both positive and negative spillovers associated with the operations of multinational enterprises (MNEs), which leads to a non-monotonic relationship between the level of foreign presence and LOEs' performance. The resulting empirical model is tested using the latest data for Chinese industry.

The paper finds a considerable support for a curvilinear and inverted U-shaped relationship between foreign presence and spillover benefits. This finding indicates that the currently prevailing euphoria about FDI rests on weak empirical foundations. It challenges the laissez-faire view that advocates the unfettered inflow of FDI as an optimal policy prescription for the development of Chinese industry. It suggests that in certain circumstances inward FDI can entail winners and losers, corresponding with foreign and indigenous firms, respectively. The presence of foreign firms beyond some level impedes the performance of LOEs in the same industry. The challenge for governments is to use their policy making powers to maximize the economic and social gains from foreign capital and to mitigate the losses for indigenous industry. Our analysis yields a hitherto unseen pattern of spillover effects.

In section 2, we present a theoretical framework by reviewing the literature. Then a description of the model and data follows. The penultimate section discusses the econometric results. The last section concludes.

II. THEORETICAL FRAMEWORK

Spillovers arise from non-market transactions when resources, notably knowledge, are spread without a contructual relationship, so-called externalities (Meyer, 2004). In the empirical literature on FDI, intra-industry spillovers have been defined as the performance-related benefits accruing to domestic firms from foreign firms operating within the same sector. Görg and Greenaway (2004) mention imitation, the acquisition of skills, competition and exports as channels through which developing host countries may achieve productivity gains via intra-industry spillovers.

A limited number of studies have considered how the relationship between foreign presence and spillover benefits might change as inward FDI rises. Some argue that a moderate foreign presence is all that is required to generate positive spillovers, even when there is a relatively wide technological gap (Perez, 1997). Evidence that the mere presence of only a few competitors is sufficient to sharpen incentives for allocative efficiency gains is provided in an empirical study of entry thresholds. Bresnahan and Reiss (1991) find that most of the competitive impact from entry comes from the first two entrants to challenge a monopolist, with the effect levelling out once market participants number around five. Likewise, demonstration effects that benefit local technical efficiency are available even when foreign presence is moderate (Haddad and Harrison, 1991). The employment of advanced foreign technology in just a few foreign affiliates is all that is needed to prove to local firms the benefits of acquiring this technology. According to this argument, small foreign capital shares are sufficient to generate spillovers, since foreign skills and managerial

practices may be then transferred via original equipment manufacturing and other mechanisms to local firms (Hsu and Chen, 2000).

More recently a number of theoretical reasons for negative spillover effects have been put forward. The key argument is that at greater levels of foreign presence, negative effects start to become apparent, and may begin to counteract positive effects. First, the productivity of LOEs might fall owing to a 'market stealing' effect. This is based on the argument that foreign affiliates (FAs) are able to compete at low marginal cost through access to the parent's ownership advantages (Aitken and Harrison, 1999). In final and intermediate markets, incoming FAs are able to draw demand away from LOEs or confine competing LOEs to less profitable segments of industry through the introduction of new differentiated products and of process innovation with improved quality control. Thus, domestic firms that compete directly with the foreign investor may lose market share and, left strand with excess capacity, experience a decline in the productive use of their resources (Mody, 2004). There is evidence that the FDI reduces productivity of local firms through market-stealing in the UK manufacturing sectors (McVicar, 2002). Negative externalities may also arise in factor market where foreign investors increase demand for scarce resources such as skilled labour and domestic credit, and hence raise production costs. Feestra and Hanson (1997) argue that foreign investors will use a more skill-intensive technology than the typical domestic investors and hence raise the wages of skilled workers, a proposition for which they find support in Mexican data (Mody, 2004)[1]. The labour-stealing by foreign firms would deprive local firms of their most productive labour and make the process of assimilating foreign technology harder.

Second, senior management in FAs often uses aggressive strategies to secure market share (Zhou *et al*. 2002). This leads to fierce competition, which may drive the LOEs to reduce production and therefore to incur higher average costs (Konings, 2000). This effect will be most pronounced in instances where local firms are subject to large fixed costs, which cannot be easily shed. Inflexible organizational structures in established domestic firms, especially state-owned enterprises (SOEs), will exacerbate this impact and the process of adjustment will be slow and inefficient.

The above reasoning suggests that at higher levels of foreign presence the market share of local firms will be cannibalized, so raising their costs of production and resulting in a 'crowding out' effect. In this situation negative spillover effects can even come to dominate positive effects. This clearly points to the possibility of curvilinearities in the effect of foreign presence on spillovers to locally owned industry. The above discussion implies that spillover benefits will increase with foreign presence up to a point. Beyond this cross-over point increased foreign presence will act — at least in part — as an impediment to the rate of growth of LOEs' performance, and spillover benefits may start to decline.

The form and the strength of the relationship between foreign presence and spillover benefits, however, may be associated with the characteristics of the industries under consideration (Kathuria, 2001). Conventional theory on MNEs and FDI suggests that knowledge-based assets are the key firm-specific advantages held by MNEs, which motivate them to invest across borders. Thus, mainstream theoretical perspectives such as the OLI paradigm (Dunning, 1993) suggest that MNEs operate in technology-intensive industries.

It follows that in technology-intensive sectors to which the ownership advantages of foreign firms are more relevant, we expect dominant positive spillover effects that enhance LOEs' performance, according to the theoretically positive arguments first put forward by Caves (1974) and reiterated by Feinberg and Majumdar (2001). These positive effects arise from technology transfer on the basis of demonstration effects and the movement of labour from foreign to locally-owned firms. In addition, foreign firms which produce differentiated products are more likely to compete with LOEs in different market segments of the technology-intensive sectors. This would mean that the scope for negative spillovers is limited since the two types of firms are less likely to be involved in head-to-head competition. It is thus expected that in technology-intensive industries the more FDI there is, the more technologies LOEs can acquire from FAs, and the higher of the performance of LOEs. Indeed, the expectation that inward FDI brings more technology spillovers has motivated many governments to offer attractive incentive packages to entice investors to technology-intensive industries.

In labour-intensive industries, however, more inward FDI may not lead to proportionately more spillover benefits to LOEs. First, the scope for technological spillovers in labour-intensive sectors is limited. This is because MNEs in these industries are not very technologically advanced. Foreign MNEs operating in labour-intensive industries may base their competitiveness more on organizational skills and marketing skills, such as experiences in organizing labour-intensive production and the ability to specialize across international borders (Shi, 1998). It follows that LOEs in labour-intensive industries would not reap much technology spillovers from FAs.

Second, developing host country local firms typically have a larger presence in labour-intensive industries, such as 'textile' and 'food', than in technology-intensive industries. These light industries are often characterized by mature saturated markets, in which circumstances the growth of FAs is likely to lead to more fierce head-to-head competition and results in the rapid cannibalization of markets serviced by traditional Chinese domestic firms. The negative effects may arise because of the price competitive nature of these markets. This would mean that local firms are unprotected by brand loyalty and, as a result negative primary and secondary effects interact in a reinforcing manner.

The above discussion leads to the following hypotheses:

Hypothesis 1: The relationship between foreign presence and spillover benefits is curvilinear, i.e., past some level of foreign presence, spillover benefits begin to fall.

Hypothesis 2: The relationship between foreign presence and spillover benefits is curvilinear in labour-intensive industries.

Hypothesis 3: The relationship between foreign presence and spillover benefits is linear in technology-intensive industries.

III. METHODOLOGY

In common with standard approach prevailing in the study of FDI spillovers (e.g., Aitken and Harrison, 1999), an augmented Cobb-Douglas production function is implemented in this study. It is assumed that the output in LOEs is a function of inputs, measures of foreign presence in these firms' industry and other control regressors. We interpret coefficient estimates on foreign presence regressor as evidence consistent with spillovers from inward FDI to domestic firms' output.

$$Y_i = C + \beta_1 K_i + \beta_2 L_i + \beta_3 MGT_i + \beta_4 SIZE_i + \beta_5 FP_{(i,-1)} + \beta_6 FP^2_{(i,-1)} + \varepsilon_i \quad (1)$$

Where Y is sales by LOEs and FP represents the level of presence of FAs, and it is measured in two dimensions in this study: the capital share accounted for by all FAs in each industry (FP_k) and the employment share accounted by all FAs in each industry (FP_l). By using two measures of foreign presence, we can get a sense of the robustness of our results. For all FP variables, one-year lag is adopted to allow time for spillovers to grow to be observable. The adoption of a lag structure for the FDI variable ($FP_{(i,-1)}$) also helps to address the question of causality with respect to spillovers[2] (Haskel, Pereira and Slaughter, 2002). We expect that FP exerts a positive and significant impact on Y .

K and L are routine capital and labour, proxied by total received capital and total number of employees in each industry; MGT and $SIZE$ are management input and scale of economy proxied by, respectively, management cost per employee[3] and net fixed assets per firm in an industry. Along with Y , all these control variables are defined for LOEs only. The employment of these control variables increases our

confidence in the robustness of the findings through controlling for influences other than foreign presence.

Nonlinearity can be captured by a variety of functional forms. The quadratic form of nonlinearity is selected for Equation (1) because it is a general form capable of identifying both accelerating and decelerating relationships. We are in particular investigating the co-existence of negative and positive spillovers from foreign presence. The quadratic form is appropriate to capture this nonlinear decline. In Equation (1) the data are transformed into natural logarithms (except for *FP* variables whose values are less than one). The equation is estimated using OLS cross-section regression analysis with White (1980) heteroscedasticity-consistent covariance matrix correction for unknown form of heteroscedasticity.

The examination of related issues is mainly based on the Industrial Annual Report of China for 2001, compiled by the State Statistical Bureau (SSB) of the People's Republic of China. The SSB kindly provided the author with the data on input and output of Chinese industries at different levels of aggregation[4]. Industry data is preferred because spillovers are commonly hypothesized to fall along industry or regional lines (Haskel, Pereira and Slaughter, 2002). In addition, there is more variation in the foreign presence variable in industry level data.

There are 196 sectors (at three-digit level) all together which, according to Chinese convention, range from mining and manufacturing to public utilities. Our sample is reduced to 166 industries for two reasons. First, on theoretical grounds we include only those industries which have been largely liberalised, with prices determined in

near to fully competitive markets and which enjoy largely free entry and exit[5]. FDI in these industries has been encouraged, with almost no restriction at all. This decision allows us to avoid biased results arising from industry selection. Second, industries for which data are imperfect are also excluded[6]. Since many of the excluded industries are mining and utilities, most industries left in our sample are pure manufacturing. Nevertheless, the data that remain provide a reliable and very rich source of information for the investigation of the relationship between foreign presence and spillover benefits.

IV. EMPIRICAL RESULTS

Table 1 provides descriptive statistics and correlation matrix for independent variables to facilitate the interpretation of regression results. As can be seen, most of the correlations are small, accounting for little common variance, and therefore are not of present concern. The high correlation between K and L demonstrates the high capital-labour substitution effect within Chinese industry. The FP variables show high correlations in the expected direction.

(Insert Table 1 here)

Tables 2 and 3 report the estimated results. Suffice to say here that in terms of diagnostics, all the models estimated were satisfactory[7]. The first set of results estimated from model (1) of both linear and curvilinear specifications is reported in Table 2. The linear specifications of the model (column (1)) show that the effect of foreign presence (FP_k) on the sales of local Chinese firms (Y) is positive and

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statistically significant, so reproducing the standard result. What merits our attention, however, is the results in the curvilinear specification (column (2)). We note that the explanatory power of the models increases when the nonlinear foreign presence term (FP_k^2) is entered. More importantly, the squared term is statistically significant. We can conclude that the curvilinear specification fits the data better than the linear specification. Columns (3) and (4) show the estimates using the measurement of foreign employment share (FP_l). We find that it makes no material difference to the results. Therefore, we focus only on the estimates using the capital share measure in this study.

(Insert Table 2 here)

The results show that there is a statistically significant, positive relationship between foreign presence and LOEs' performance. Furthermore, there is a negative relationship between foreign presence squared and LOEs' sales. The latter relationship suggests a curvilinear relationship and combined, these two relationships denote a potential inverted-U shaped relationship between foreign presence and LOEs' performance, thereby supporting Hypothesis 1. Thus, in our sample, low and moderate levels of foreign presence are positively related to LOEs' performance, but further rising level of foreign presence is likely to lead to declining spillover benefits to LOEs. The relationships depicted provide some support for the theoretical arguments presented earlier. This finding is also consistent with that of Buckley *et al.* (2002), which find some evidence that inward FDI negatively impacts on the performance of Chinese domestic industry. Our review has suggested that the literature offers some reasons for negative competitive impacts in the form of market stealing effects (Aitken and Harrison, 1999).

The point of inflection, where spillovers begin to decline, can be computed by taking the partial derivative of regression equation (1) with respect to foreign presence variable (FP_k) as follows: $\delta Y / \delta FP_k = \beta_5 + 2(\beta_6 FP_k)$. This partial derivative represents the slope of the spillover benefit curve with respect to FP_k . It implies that positive spillover effects reach a maximum at the cross-over point, and subsequently decline as negative effects come to dominate with rising levels of foreign presence. Hence, by substituting the β coefficients, the point of inflection can be obtained. Based on this procedure, the turning point was in our case 0.619 (61.9 percent). In our sample we identify twenty-three industries as beyond the turning point in the FDI-spillover relationship, and find that the majority of industries (143 or 86.2%) lie to the left of this maximum. According to our results, for the most part, domestic Chinese industry is not colonized to an extent that should cause concern.

The discussion in the literature review suggested that technology intensity is a potentially important means of discriminating between those host industries likely to experience differential level of spillover benefits. Accordingly, we test for structural difference in the relationship between foreign capital share and LOEs' performance, on the basis of those industries with high and low capital-labour ratio share. This is done by breaking the sample into two equal groups of 83 industries according to the level of capital-labour ratio. We label the low capital-labour ratio group as 'labour-intensive industries' and the high capital-labour group as 'technology-intensive industries'. The designation of capital-intensive industries as technology-intensive is justified by the embodiment of technology in physical capital[8]. We carried out a Chow Test and the result confirms that there is indeed a structural difference (F

statistic 4.222, which exceeds the critical value of $F_{0.01} = 2.96$). Through this method of classification, in addition to alleviating the problem of heterogeneity, the difference in foreign presence effect on LOEs' performance between the labour- and technology-intensive sectors can be explored.

We now re-estimate equation (1) for these two groups of Chinese industries separately. The results are presented in Table 3. The variable *MGT* is dropped since it is insignificant in all regressions throughout in the full sample. In the labour-intensive group, FP_k^2 is significant in the curvilinear regression (column (2)) and this regression again has higher explanatory power than the linear specification (column (1)). Therefore, the curvilinear specification is still preferable to the linear specification in this group.

(Insert Table 3 here)

Both FP_k and FP_k^2 in column (2) are correctly signed and are statistically significant. In particular, we notice that FP_k^2 records larger magnitude in both coefficient and significance in the labour-intensive group than in the full sample. These results suggest that the proposed curvilinear relationship between foreign presence and the performance of LOEs is most prominent among labour-intensive sectors. This finding corroborates Hypothesis 2. The finding illustrates that it is the labour-intensive industries that dominate the relationship between foreign presence and spillover benefits in the full sample. It also suggests that market stealing effects are even stronger in labour-intensive sectors, in which competition is most intense.

These negative impacts are amplified by barriers to exit by Chinese SOEs or by impediments to LOEs' exploitation of scale economies arising from foreign presence.

We again calculate the point of inflection with respect to the foreign presence variable in column (2). In this case it is 0.542 (54.2%). In the labour-intensive group we find twenty-three sectors as beyond the turning point (quite a coincidence with the case of full sample). Though this result means that the majority of the labour-industries (60 or 72.3%) still lie to the left of this maximum, the lower level of the threshold implies that spillover benefits reach the maximum earlier in labour-intensive industries than in the whole manufacturing. Furthermore, we note that the percentage of sectors which are beyond the cross-over point in the labour-intensive group (27.7%) is twice that in the full-sample (13.8%). This result reinforces our above conclusion with respect to the particularly strong market-stealing effect in the labour-intensive industries.

In technology-intensive group, however, the linear regression (column (3)) is found to be superior to the curvilinear one (column 4)) with the explanatory power being higher in the former. More importantly, the coefficient on FP_k^2 is not statistically significant in the curvilinear model, indicating that a curvilinear relationship can not be established in the technology-intensive group.

The positive and significant FP_k in column (3) suggests that the performance of LOEs is linearly correlated with rising foreign presence in technology-intensive sectors and in stark contrast to the case of labour-intensive sectors. This result is consistent with previous studies such as Kathuria (2001) who find greater spillover

effects to domestic firms belonging to the 'scientific' sectors. Our finding of linear profile might be generated by a situation in technology-intensive industries in which negative spillovers are either absent or are more or less invariant with the level of technology while positive spillovers are rising. One interpretation is that in technology-intensive sectors foreign firms tend not to compete head-to-head with LOEs, therefore dramatically reducing the scope for market stealing effects. This finding is also consistent with the view that LOEs in technology-intensive industries are more prone to benefit from FDI technological spillovers than their counterparts in labour-intensive industries.

The credibility of our findings is enhanced through the use of other theoretically relevant variables as controls. Labour variable (L) is positive and statistically significant at the 1 per cent level in all the regressions throughout, while capital variable (K), though significant in the Table 2, records smaller magnitude in both coefficient and significance, and even becomes marginally significant and insignificant in the Table 3. This finding confirms the generally labour intensive nature of the Chinese industry. The management variable (*MGT*) is positive but insignificant, highlighting the weak role of management in the Chinese industry though China has for many years been in its transition to a market-oriented economy. *SIZE* reaches significance in all instances with an exception of technology-intensive group. This indicates that size of firm (in terms of net fixed assets) is an important strategic variable for business performance in Chinese domestic industry, and suggests the importance of exploiting scale economies. We interpret the lack of significance of *SIZE* variable in the technology-intensive sectors as an indication that these industries are dominated by small- and medium-sized high technology

enterprises to which size of operation is not crucial for business success, compared with firms operating in traditional sectors.

V. CONCLUSIONS

The results provide support for all three hypotheses. The paper finds clear evidence of a curvilinear relationship between foreign presence and spillover benefits to domestically owned industry in China. This curvilinear relationship, compared with linear relationship found in previous studies, defines better the nature of the FDI-induced spillover benefits. The finding suggests that 'the more FDI, the better' thesis in the sense of spillover benefits is only verified in the range defined by the threshold of just about two-third of foreign capital share in the Chinese industries concerned. Indeed, along with our finding of declining spillovers, another key conclusion of this paper is that moderate levels of foreign presence are beneficial to the performance of Chinese locally owned firms.

Furthermore, we find that the form and the strength of the relationship between foreign presence and LOEs' performance depend on the characteristics of the industry involved. The curvilinear relationship is particularly stronger in labour-intensive industries, where foreign and locally-owned firms compete head-to-head in the saturated market for standardized goods, leading to 'crowding out' effect on domestic firms. This finding is in marked contrast with that for technology-intensive sectors where spillover benefits grow linearly with rising foreign presence.

The finding of a curvilinear effect that begins positive and eventually turns negative fits the theoretical arguments presented. At this point, the complexity of spillovers overwhelms the positive benefits of foreign presence, and LOEs' performance begins to suffer. The results of the study clear up of the mixed findings from previous empirical studies and add insights to otherwise unexpected questions. More empirical validation is necessary for the construction of a more complete theory of the relationship between inward FDI and spillover benefits.

The approach that this study employs is a methodological improvement on existing studies, and our finding of a curvilinear relationship has implications for research on spillovers. We conclude that the mixed, contradictory and weak results found in many studies have been caused, at least in part, by a failure to accurately capture the non-linear nature of the relationship between foreign presence and spillover benefits.

Methodological improvement along the lines that we advocate is perhaps most critical where the host is a developing rather than a developed country. In developed countries competitive locally-owned firms are present. But in developing countries we should expect the productivity gap between foreign and domestically-owned firms to be large. In these conditions many local firms may be unable to improve their performance quickly. Fast growing and high foreign penetration rates are more likely the less competitive is domestic industry, providing a source of negative productivity spillovers, and an early diminution of spillover benefits.

Policy implications arise from our findings. The limiting of further growth in foreign presence in liberalized industries is circumscribed by China's accession to the

WTO. However, it is quite permissible for policy to encourage the upgrading of Chinese domestic industry to keep pace with the growth of foreign presence. The strengthening of local competitiveness might involve the stimulation of new privately owned Chinese firms that are best able to benefit from the presence of FAs. To date the main instrument for building up Chinese firms has been inward FDI itself, and our research suggests that this has been successful. But as foreign penetration shares rise, it becomes imperative to ensure that domestically-owned firms are capable of appropriating the beneficial aspect of spillovers. This study also suggests that China should accelerate the removal of remaining foreign ownership restrictions in Chinese industry. Our results demonstrate that foreign presence is of general benefit across industrial sectors. Above all our findings suggest that a policy mix to promote a moderate rather than a dominant foreign presence is best.

This study indicates some avenues for future research. First, further investigation at the industrial level will be beneficial. This will help to more accurately determine not simply the point at which the presence of foreign firms ceases to add to spillover benefits, but also what industrial characteristics are involved and what precise policy measures may be used to extend the growth of positive spillovers. Second, if future research can investigate the apparent co-existence in the data of negative and positive spillovers from foreign presence, it may be of considerable value for the fine tuning of policy to limit the negative and encourage the positive effects.

ENDNOTES

[1] Chakraborty and Basu (2002) however found that inward FDI in the host country produces a labour-displacing effect. This arises because the technology transfer brought in by FDI causes an excess supply of labour creating downward pressure on unit labour costs. It seems that further evidence on the impact of FDI on labour costs is still needed.

[2] The association between FDI and LOEs' performance may be a result of MNEs entering industries with higher performance, rather than of performance being raised by FDI (Meyer, 2004). While we make optimal use of the data that are available by adopting a lag structure, panel data would be better able to address the issue of causality.

[3] This measure of managerial input is recorded in the Chinese statistical source, and refers to the salaries of managers plus other fees that facilitate transactions.

[4] The Report is not publicly published and is produced primarily for internal use within the SSB. It bears similarities with the widely-cited Third Industrial Census of China published by the SSB (1997) in contents, and indeed it is produced especially for the years for which the industrial census is not conducted.

[5] According to this principle, we excluded industries in which the government prohibits the operation of non state-owned enterprises, and this naturally includes foreign firms. These state monopoly industries include 'Oil extraction', 'Gas extraction', 'Petrolo-shale mining', 'Other black metal ore mining', 'Precious metal ore mining', 'Salt production', 'Tobacco production', 'Other Tobacco processing', and other industries relating to the production and supply of electricity, gas and water. Also excluded are industries where the government is the monopoly or major purchaser of products, and where non-state firms are largely denied from entering. These industries include 'Locomotive manufacturing', 'Far ocean ships', 'Aerospace crafts', 'Telecommunication transmission equipment', 'TV and broadcasting equipment', 'Radar'.

[6] These include 'Other non-metal ore mining', 'Other ore mining', 'Logging of timber', 'Logging of bamboo', 'Salt processing', 'Tramcar manufacturing', 'Instrument repairing', 'Arts and crafts', 'Daily groceries', 'Other groceries'.

[7] The results of the normality test are not highly satisfactory for some models and caution needs to be exerted when interpreting results. It is generally accepted that this test has no properly defined alternatives and so has limited power.

[8] The literature often links the magnitude of FDI spillovers with technology intensity of the industries involved (e.g., Liu *et al*. 2000)

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Table 1. *Descriptive Statistics and Correlation Matrix (N=166)*

Variables	Mean	S.D.	2	3	4	5	6	7	8
1. K	3.67	1.61	0.94	0.24	0.57	-0.17	-0.20	-0.25	-0.24
2. L	2.32	1.48		-0.04	0.38	-0.19	-0.22	-0.30	-0.28
3. MGT	8.99	0.51			0.55	-0.13	-0.11	-0.04	-0.01
4. $SIZE$	8.01	0.81				-0.26	-0.21	-0.16	-0.08
5. FP_k	0.37	0.21					0.96	0.85	0.73
6. FP_k^2	0.18	0.17						0.86	0.79
7. FP_l	0.22	0.18							0.95
8. FP_l^2	0.08	0.11							

Table 2. *Regression Results (Full sample, N=166)*

Dep. Var.: Y	Foreign Capital Share		Foreign Employment Share	
	Linear	Curvilinear	Linear	Curvilinear
	(1)	(2)	(3)	(4)
K	0.343 (3.12)***	0.324 (2.97)***	0.275 (2.37)**	0.261 (2.29)**
L	0.577 (5.01)***	0.585 (5.13)***	0.650 (5.42)***	0.659 (5.57)***
MGT	0.072 (0.82)	0.069 (0.81)	0.118 (1.30)	0.121 (1.35)
$SIZE$	0.312 (5.09)***	0.339 (5.58)***	0.296 (4.71)***	0.328 (5.10)***
FP_k	0.625 (4.43)***	1.639 (3.03)***		
FP_k^2		-1.327 (-2.15)**		
FP_l			0.471 (2.85)***	1.930 (3.86)***
FP_l^2				-2.409 (-3.25)***
$\overline{R}^2$	0.960	0.962	0.956	0.959
F-statistics	798.07***	689.07***	727.50***	649.70***
Functional Form (Ramsey's RESET, one term)	0.07	0.06	0.38	0.00
Normality of Distributed Errors (Jarque-Bera)	3.85	1.59	5.21*	2.20

Notes:

1. Figures in parentheses are t statistics (two-tailed tests); *, **, and *** denote significance at the 10%, 5% and 1% levels respectively.

2. For ease of expression, the estimates for the Constant term are suppressed.

3. The approach for 'normality of distributed errors' also serves to test for outliers and, is sometimes used as a general test for misspecification (Kennedy, 2003).

Table 3. *Regression Results (sub-samples)*

Dep. Var.: Y	Labour-intensive sectors (N=83)		Technology-intensive sectors (N=83)	
	Linear	Curvilinear	Linear	Curvilinear
	(1)	(2)	(3)	(4)
K	0.250 (1.83)*	0.233 (1.64)*	0.246 (1.35)	0.236 (1.29)
L	0.684 (5.34)***	0.696 (5.21)***	0.714 (3.74)***	0.723 (3.79)***
$SIZE$	0.390 (4.35)***	0.420 (4.90)**	0.153 (1.10)	0.154 (1.09)
FP_k	0.729 (3.48)***	2.634 (4.21)***	0.556 (2.67)***	0.767 (0.99)
FP_k^2		-2.432 (-3.17)***		-0.279 (-0.33)
$\overline{R}^2$	0.942	0.948	0.972	0.971
F-statistics	317.01***	288.34***	673.54***	532.75***
Functional Form (Ramsey's RESET, one term)	0.01	0.03	0.51	0.38
Normality of Distributed Errors (Jarque-Bera)	3.63	0.89	5.42*	6.18**

Notes:

See Table 2.